



Brain Growth, Pretend Play, and the Outdoors

Erin Akers, M.Ed.
Director of Education and
Development
www.gesellinstitute.org
erin@gesellinstitute.org



“If we use effective tools,
the child reveals himself to
all who will stop and listen
to what he says, and who,
with *seeing eyes*, will watch
what he does.”

Arnold Gesell



1880



1911



1950



2012



2017



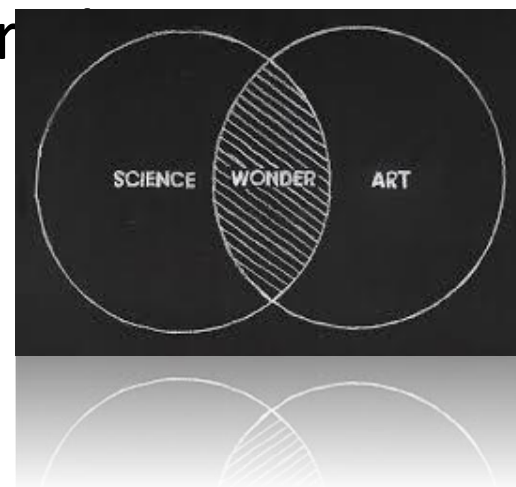
Our Mission

Promote the principles of
child development, inspired
by

Innovation

&

Objective Wonder

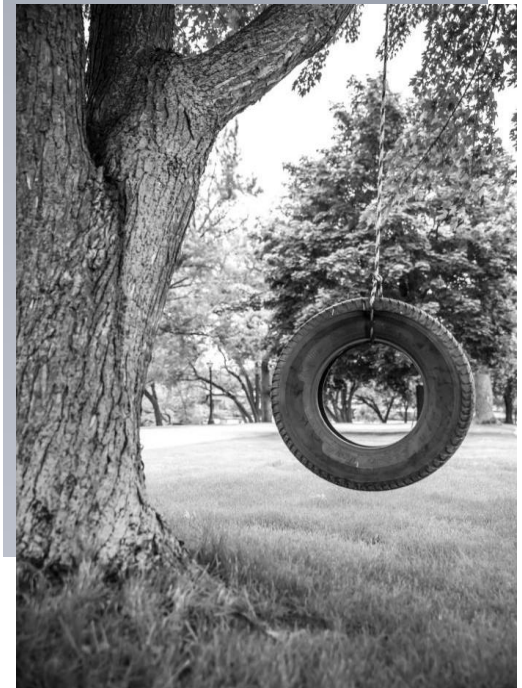
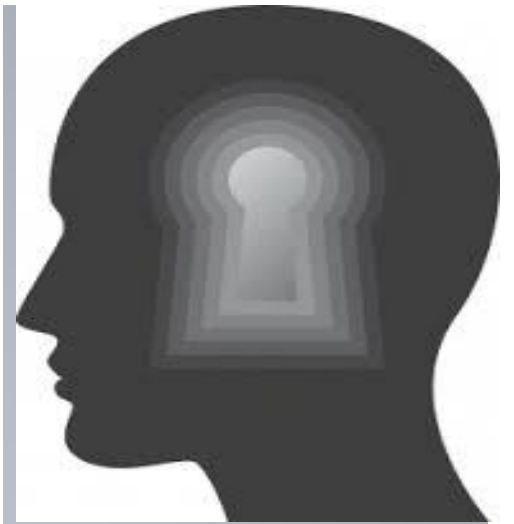


Know Yourself

Know Kids

Know Your Kids

Our Mission: Operationalized

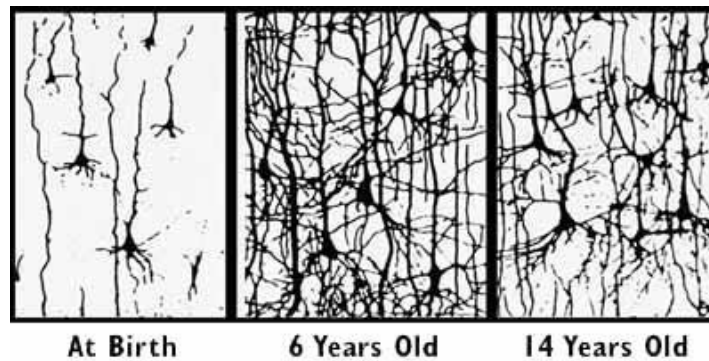
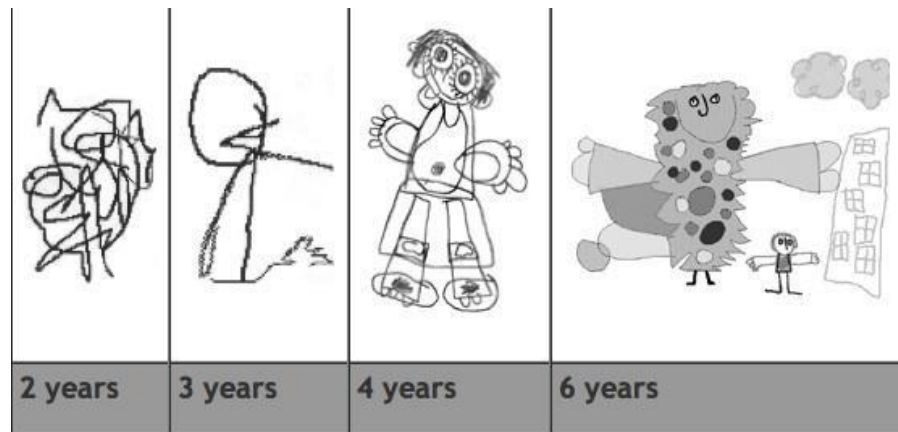


What We All Need to Know: Basics of Child Development

- All children go through the same stages of development
- Each child has his/her unique pace
- Sooner is not better
- Specific behaviors associated with age and stage
- Need to respect development, and try to enjoy each stage for what it is

How Do Children Learn? *(What grows brains best?)*

- In supportive, secure and caring environments
- Through experiences and interactions
- As they progress through developmental stages
- As they explore and play



Synaptic Density in the Human Brain
Harvard Center on the Developing
Child

The Brain

- We knew it was early, but we didn't know it was that early.
- It's not (just) about the words.
- It's not (all) about me.

The Brain



*From Neurons to
Neighborhoods (2000)*

*Transforming the Workforce
for Children Birth through Age 8
(2015)*

*What More Has Been
Learned (2016)*

- We knew it was early, but we didn't know it was that early.



*From Neurons to
Neighborhoods (2000)*

*Transforming the Workforce
for Children Birth through Age 8
(2015)*

*What More Has Been
Learned (2016)*

The Brain

- It's not (just) about the words.

The Brain



*From Neurons to
Neighborhoods (2000)*

*Transforming the Workforce
for Children Birth through Age 8
(2015)*

*What More Has Been
Learned (2016)*

- It's not (all) about me.

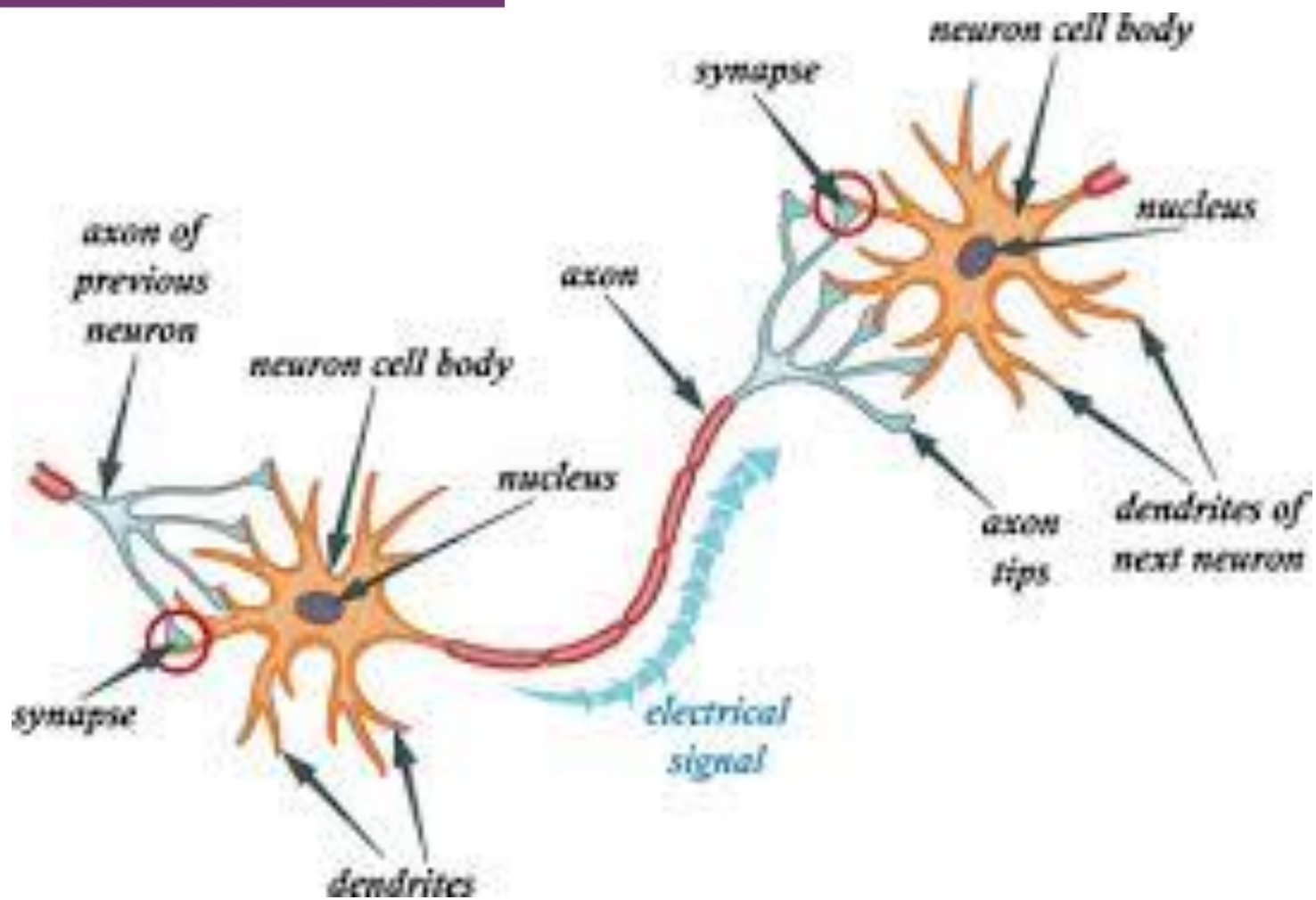
The Brain



*From Neurons to
Neighborhoods (2000)*

*Transforming the Workforce
for Children Birth through Age 8
(2015)*

*What More Has Been
Learned (2016)*



The Brain: Neuron



Newborn



1 Month



9 Months



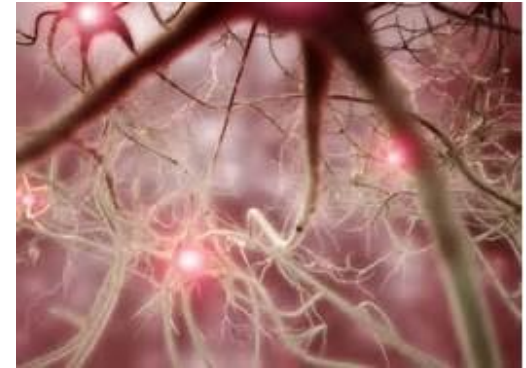
2 Years



Adult

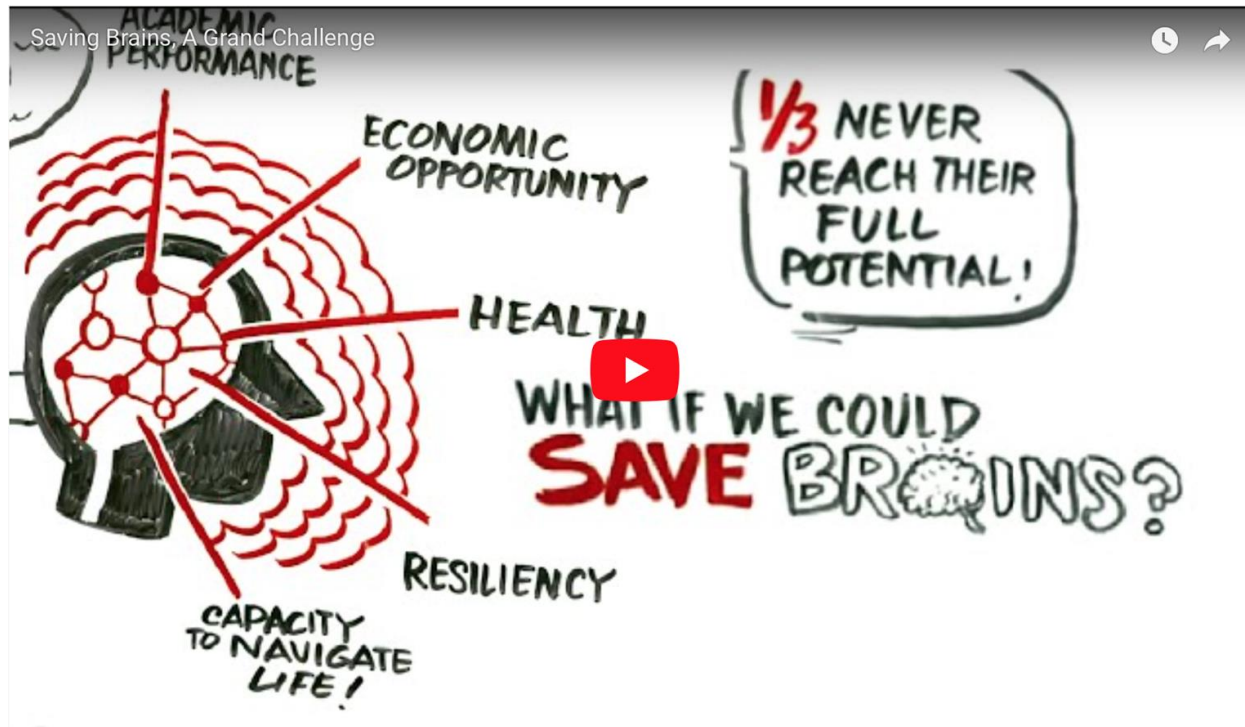
The Brain

- In the first few years of life, more than 1 million new neural connections are formed every second
- After a period of rapid proliferation, connections are reduced through a process called pruning, so that brain circuits can become more efficient.
- Early experiences affect the nature and quality of the brain's developing architecture by determining which circuits are reinforced and which are pruned through lack of use.



R. Shore, Rethinking the Brain: New Insights into Early Development (p. 20). New York: Families and Work Institute, 1997.

“Use it or lose it.”



Dr. Mike Evans in
Whiteboard Med
School Videos

Saving Brains



THE BRAIN & EARLY CHILDHOOD

What the research tells us

Old Myth...

- How a brain develops depends on the **genes** you were born with. Biology is destiny.

New Knowledge!

- How a brain develops depends on a complex **interplay** between the **genes** you are born with and the **experiences** you have.

Old Myth...

- The experiences you have before age 3 have a **limited** impact on later development.

New Knowledge!

- Early **experiences** have a **decisive impact** on brain architecture, and adult capacities.

Old Myth...

- **Secure relationships** create a favorable **context** for early development and learning.

New Knowledge!

- **Early interactions** don't just create a context; they **directly affect** the way the brain is "wired".

Old Myth...

- Brain development is **linear**; the brain's capacity to learn and change grows steadily as a child progresses toward adulthood.

New Knowledge!

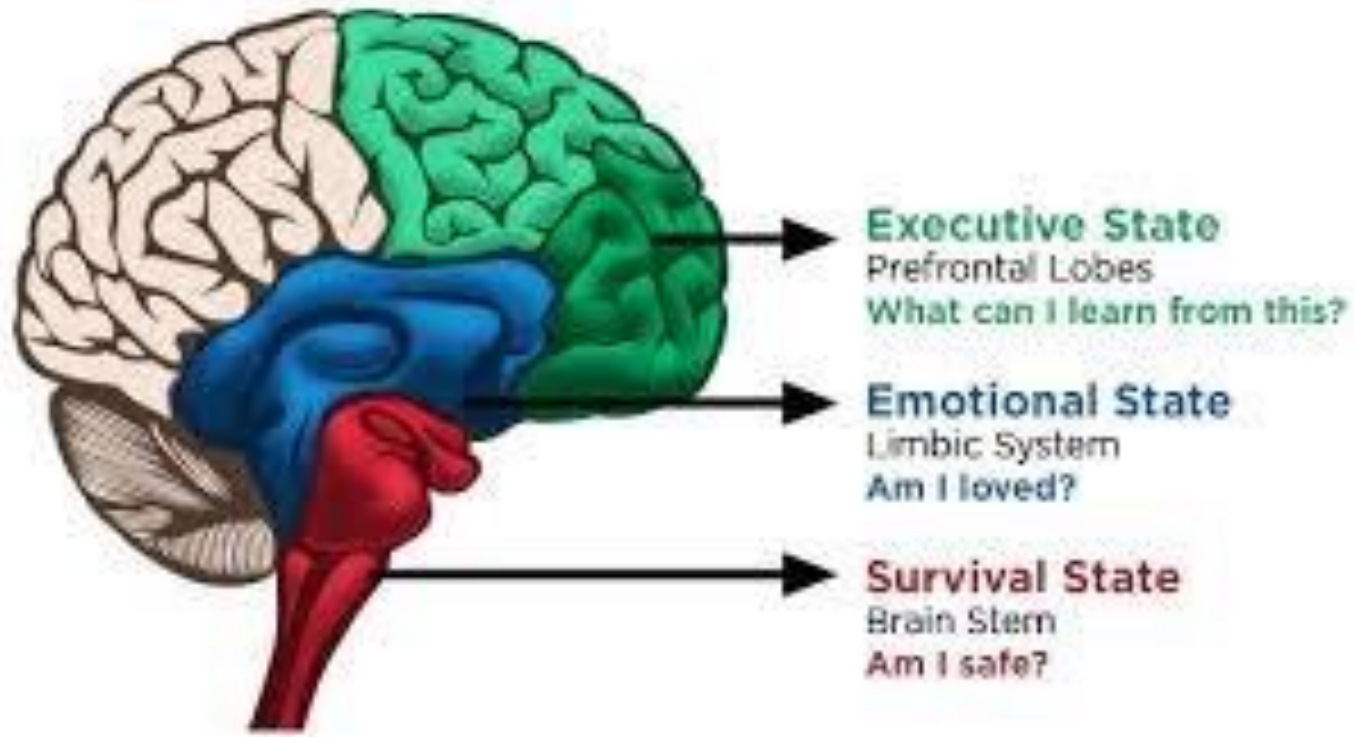
- Brain development is **non-linear**; there are **sensitive periods** to acquire specific kinds of knowledge and skills.

Old Myth...

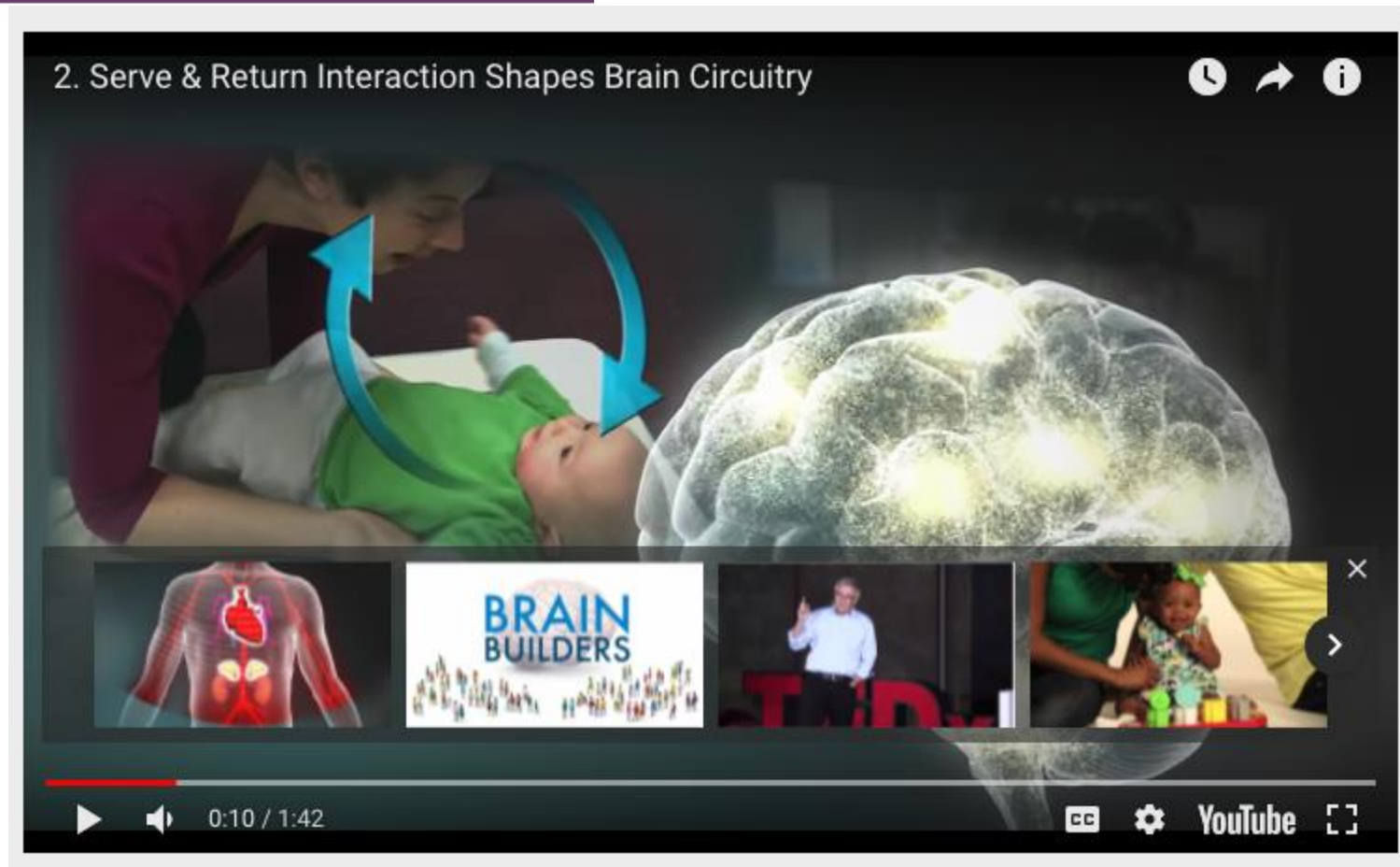
- Young brains are **less active** than older brains; a toddler's brain is less active than the brain of a college student.

New Knowledge!

- By the age of 3, children's brains are **twice as active** as those of adults. Activity levels drop during adolescence.



3 Part Brain



THE BRAIN & EARLY CHILDHOOD

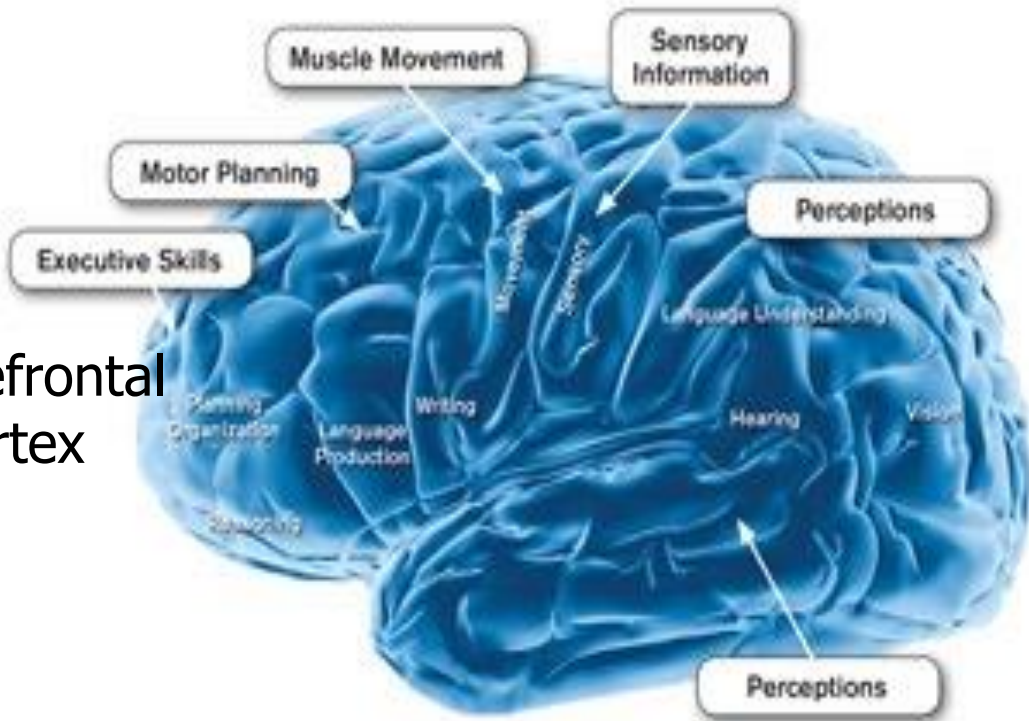
Serve & Return

1. Notice the serve and share the child's focus of attention
2. Return the serve by supporting and encouraging
3. Give it a name!
4. Take turns...and wait. Keep the interaction going back and forth.
5. Practice endings and beginnings

<https://developingchild.harvard.edu/resources/5-steps-for-brain-building-serve-and-return/>

THE BRAIN & EARLY CHILDHOOD

Serve & Return



Prefrontal Cortex

Executive Function

Self Control

Working Memory

Cognitive Flexibility

- Focus*
- Self-control*
- Persistence*
- Perspective-taking*
- Communication skills*
- Making connections*
- Critical thinking*
- Problem Solving*
- Creativity*
- Flexibility*
- Taking on challenges*

- Focus
- Self-control
- Persistence/Engagement
- Perspective-taking
- Communication skills
- Making connections
- Critical thinking
- Problem Solving
- Creativity
- Flexibility
- Taking on challenges

Executive Function

- **Self-Control**
- **Working Memory**
- **Cognitive Flexibility**

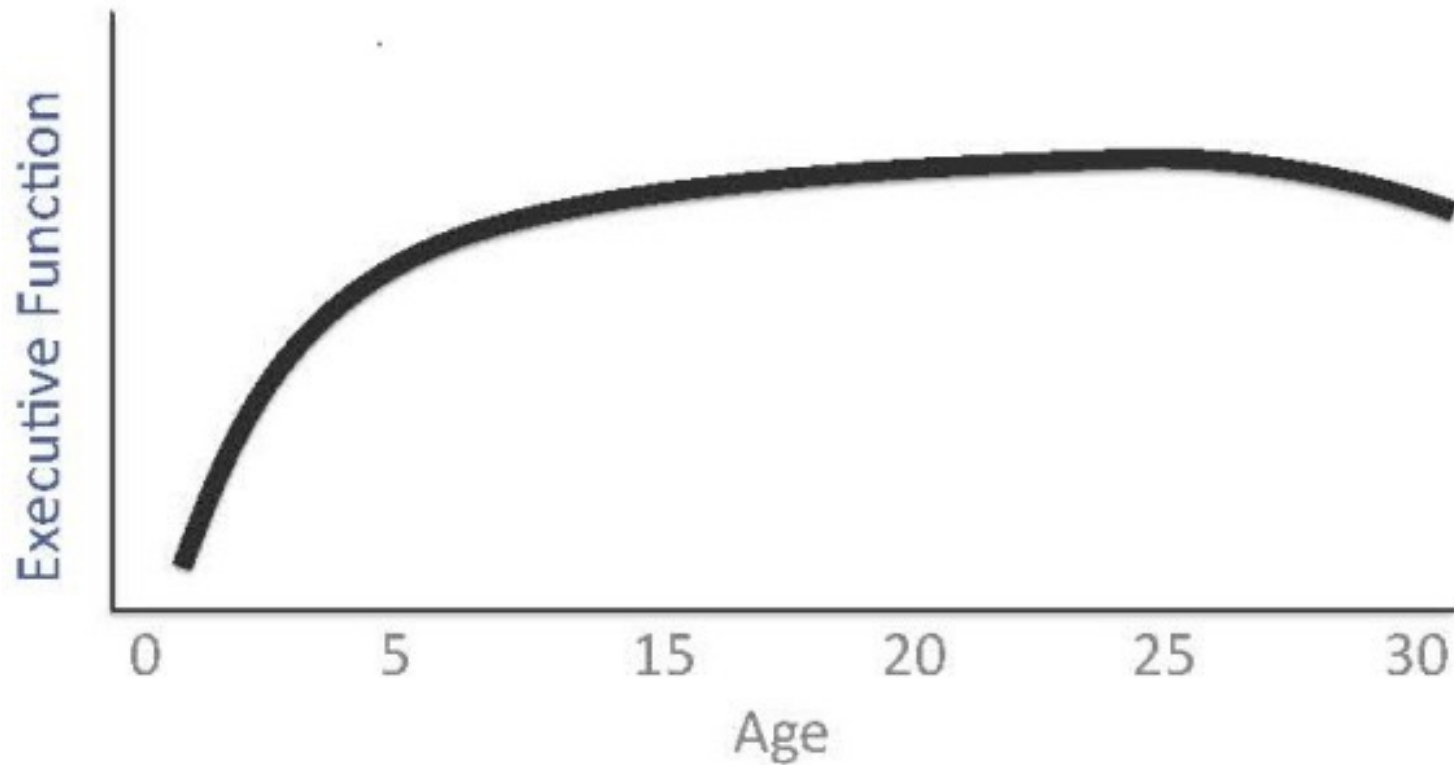
Major Components of Executive Function

A Window of Opportunity

A range of tests measuring different forms of executive function skills indicate that they begin to develop shortly after birth,

with ages 3 to 5 providing an important window of opportunity for dramatic growth in these skills.

Growth continues throughout adolescence and early adulthood; proficiency begins to decline later in life.



Carlson, 2012

Executive Function Over Time

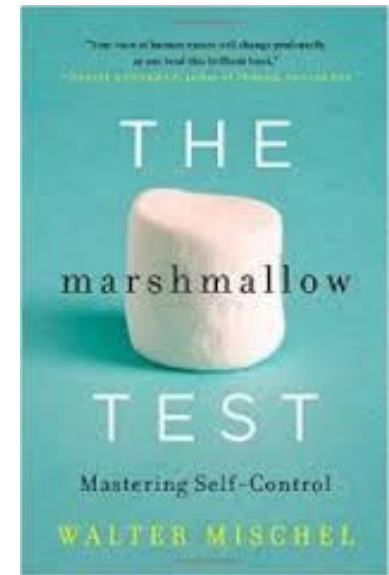
1972 - 2000

Consistency: In general, children who were less successful at resisting the marshmallow all those years ago performed more poorly on the self-control task as adults.

Outcomes: Higher SAT scores, lower levels of substance abuse, lower likelihood of obesity, better responses to stress, better social skills as reported by their parents, and generally better scores in a range of other life measures.

fMRI: When presented with tempting stimuli, individuals with low self-control showed brain patterns that differed from those with high self-control. The researchers found that the prefrontal cortex (a region that controls executive functions, such as making choices) was more active in subjects with higher self-control. And the ventral striatum (a region thought to process desires and rewards) showed boosted activity in those with lower self-control.

The Marshmallow Experiment (Walter Mischel, 1972)



Casey, B. J., et al. (2011). Behavioral and neural correlates of delay of gratification 40 years later.

Mischel, Shoda, Peake (1988). The nature of adolescent competencies predicted by preschool delay of gratification.

Mischel, Shoda, Rodriguez (1989). Delay of gratification in children.

- Include child in the decision making process and give lots of choices
- Leave time for exploratory self-guided play
- Assign jobs that can be accomplished independently
- Engage in exploratory conversations
- Build routines
- Do practice runs
- Mindfulness exercises

Developing Self Regulation Skills

HARVARD CENTER ON THE DEVELOPING CHILD



Don't avoid or try to prevent difficult situations

Provide supportive framework with scaffolding

Modeling and practice



CHILD MIND INSTITUTE

“approach self-regulation skills in the same way (we) approach other skills, academic or social: Isolate that skill and provide practice”

(Bezsylo, Child Mind Institute)

Developing Self Regulation Skills

Young Children Learn Through ..

- Physically interacting with the environment
- Using all their senses
- Building new knowledge based upon existing knowledge — stair-steps



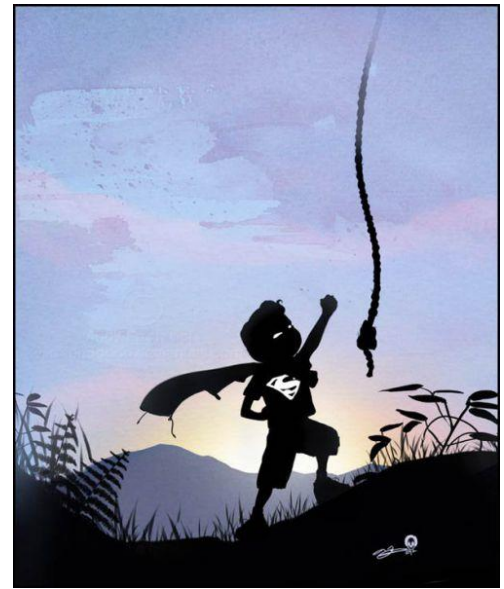
... PLAY

All Play Is Important

- Construction play/
woodworking
- Creative play
- Manipulative play
- Sand and water
- Play with symbols
- Exploratory play
- Gross motor
- Functional play
- Oral language play
- Music play
- Group/game with
rules play
- Dramatic play
- Pretend/Make
Believe
- **Socio-dramatic play**

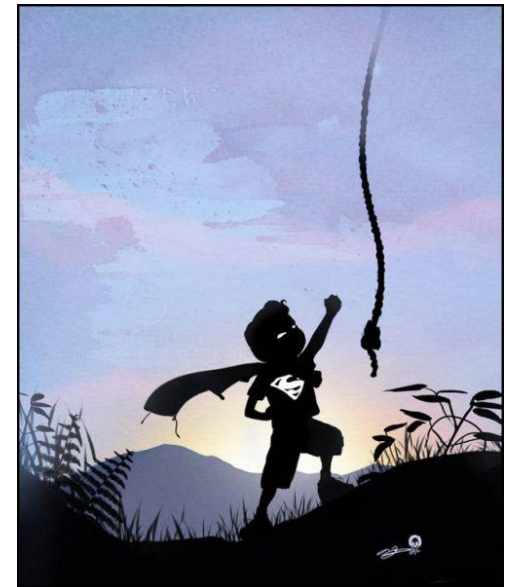
- **Plan:** children's ability to think about play in advance of playing
- **Roles** children play: including the actions, language, and emotional expressions that are associated with a specific role
- **Props:** the objects (real, symbolic, and imaginary) children use in play

Elements of Play



Leong and Bedrova, 2012

- **Extended** time frame: play that lasts for long stretches of time: within one play session for an hour or longer or extending over several play sessions and over several days
- **Language:** what children say to develop a scenario or coordinate the actions of different players as well as speech associated with a particular role
- **Scenario:** what children act out, including the sequence of scripts and interactions between roles



Leong and Bedrova, 2012

Elements of Play

Mature Socio-Dramatic (SD) Play Is Most Advanced

- Deep engagement
- Two or more players
- Planned in advance
- Roles with rules
- Scenarios change and adapt
- Symbolic props
- Interactions using language
- Voluntary self-regulation and “rules” of the role

What's Developing During SD Play?

- Each role has a set of defining “rules”
- Child must inhibit behaviors that are contradictory to the role
- Must take turns
- Symbolic thinking



What's Developing During SD Play cont.

- Child must be creative and problem solve — What next? What if?
- Child must be flexible
- Child strengthens language by using language





We advocate for a whole-child, play-based approach to learning - an approach to teaching that meets children where they are and stretches them in all areas of their development: Physical, Intellectual, Social-Emotional & Creative Expression

Outdoor Play has the potential to support all areas of the developing child.

Outdoor Play



**“It takes time —loose, unstructured
dreamtime — to experience nature in
a meaningful way.”**

**-Richard Louve
*Last Child in the Woods***

The Playground: Key Features



Loose Parts, Digging Sand, Soil & Water, Connection with Plants & Animals, Shade, Gathering Spaces, Opportunities for Collecting/Gathering Treasures, Climbing Areas

Loose Parts

gutters, tubes
rope, yarn, tape
jewels
buckets
wheel barrows
shovels
pulleys
tarps
step ladders
field guides
crayons
pencils
paint
paper



...logs, sticks, rocks, flowers, leaves...

+

Digging Sand, Soil & Water



- 1.) making forts and special places
- 2.) hunting and gathering
- 3.) shaping small worlds
- 4.) developing friendships with animals
- 5.) constructing adventures
- 6.) descending into fantasies
- 7.) following paths and figuring out shortcuts



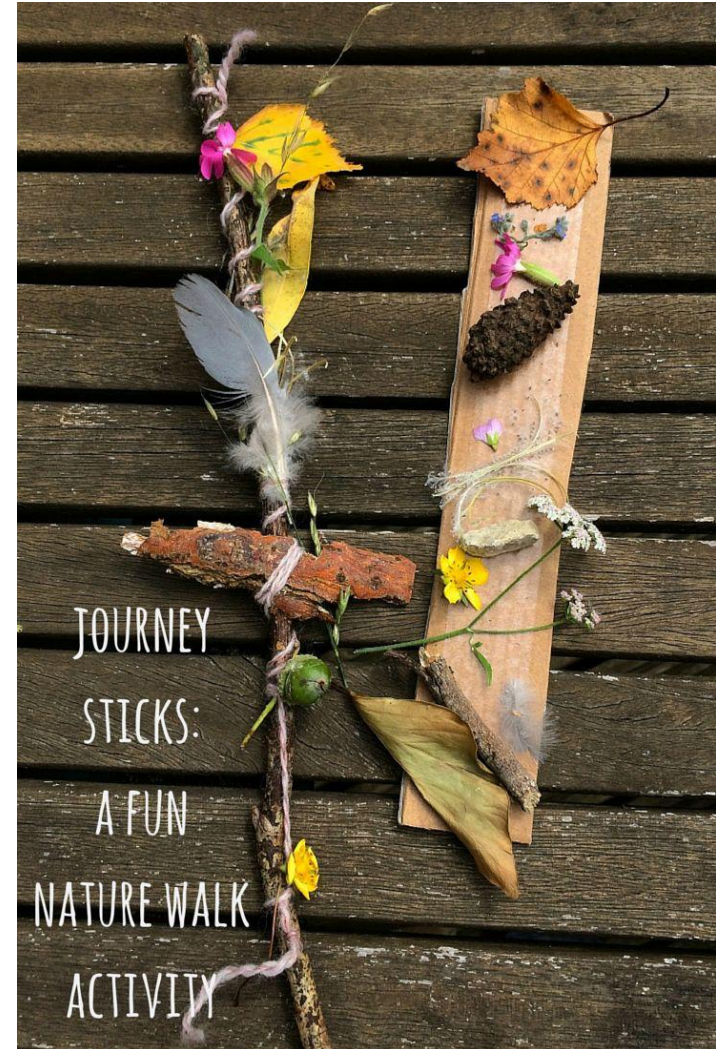
*Children and Nature:
Design Principles for Educators*

David Sobel's "Play Motifs"

Forts, Shade & Private Spaces



Opportunities for Collecting



Creating Paths and Shortcuts



Connection with Nature (Plants & Animals)

- Landscaping/Gardens
- Animal Feeders/Homes
- Access to Diverse Habitats (woodland, meadow, field, pond, river, marsh)



Connect with your Local Nature Center

- birds of prey (or other animal) demonstrations
- maple sugaring
- butterfly/preying mantis/ladybug hatching
- wild edible foraging/guided hikes
- vegetable gardening
- collections (nests, seeds, animal skeletons, etc.)





Constructing Adventures:
Climbing & Jumping Areas



Risk vs. Hazard





Risk Assessment

The Teacher's Role

- **prepare the environment with invitations to play, but leave space for activities that are not result/expectation driven**
- allow children their own discoveries, judgments and joys
- **provide ample TIME**
- **Risk vs. Hazard Assessment**
- let children take ownership of decisions & their consequences
- ensure children are protected from the elements
- OBSERVE
- **model & do** vs. teach and lecture
- practice compassion and involve children in acts of kindness
- create community through circle time, sharing meals, working together and celebrating with families



David Sobel,
*Nature Preschools and
Forest Kindergartens:
The Handbook for
Outdoor Learning*

Do Inside Work Outside

circle time/stories
journaling
painting
eating snack/lunch



Bring the Outdoors In: The Classroom

- Natural Light
- Plants
- Animals
- Books & Field Guides
- Choose Wood and Natural Materials over Plastics and Synthetics (furnishings, rugs, toys...)
- Animal puppets, nature-inspired manipulatives in dramatic play centers



Natural materials nourish and feed the senses



- Wood
- Silk
- Wool
- Beeswax



Montessori: Prepared Trays & Lessons

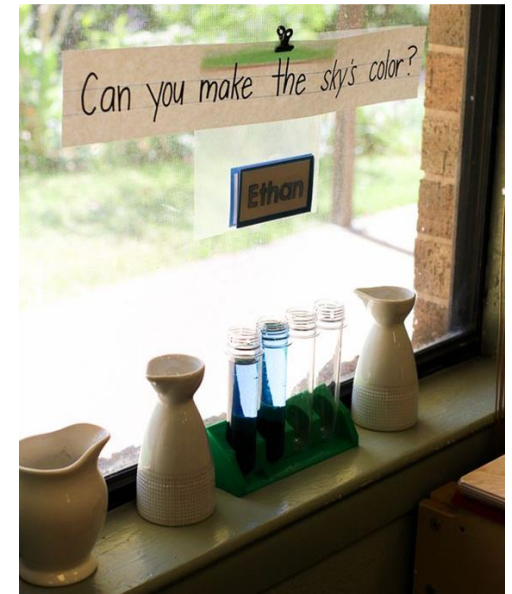


Are Seeds the Same? Science Investigation

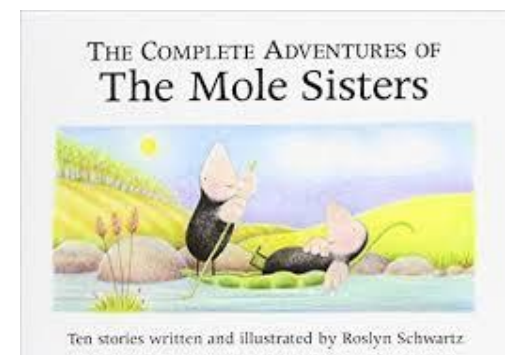
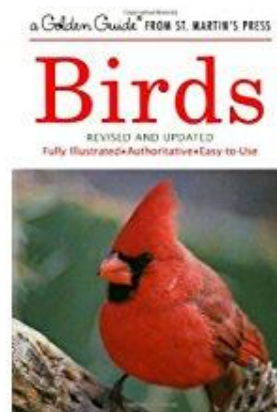
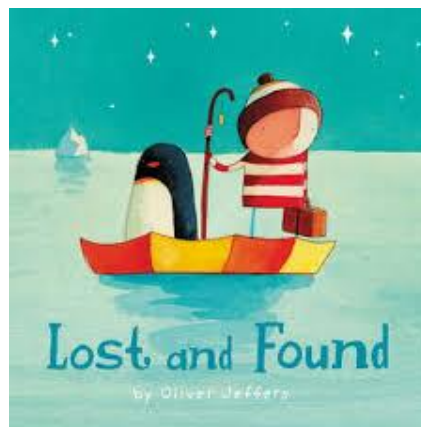
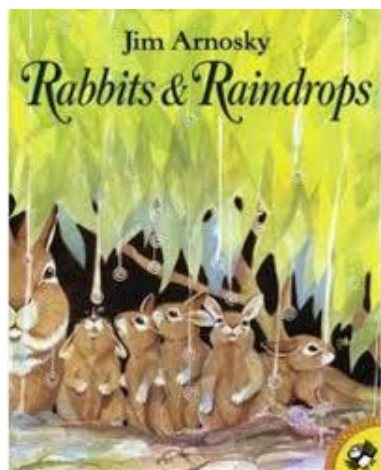
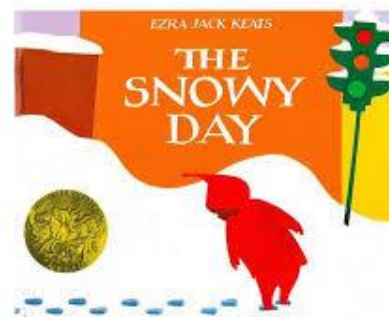
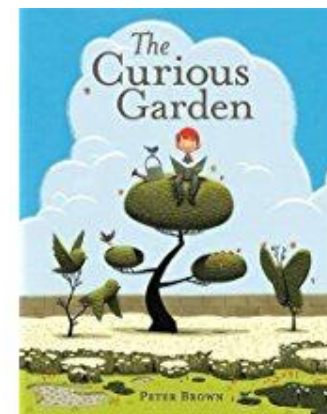
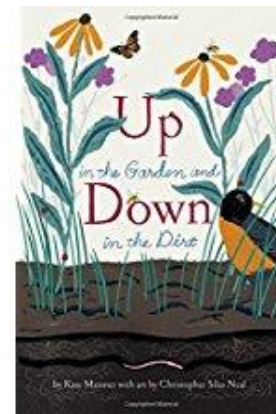
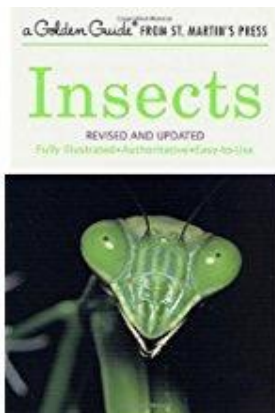
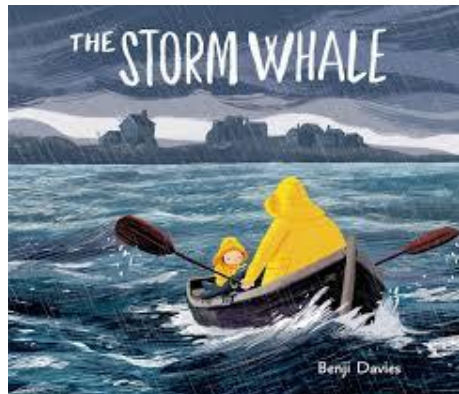




Nature-Inspired Activities

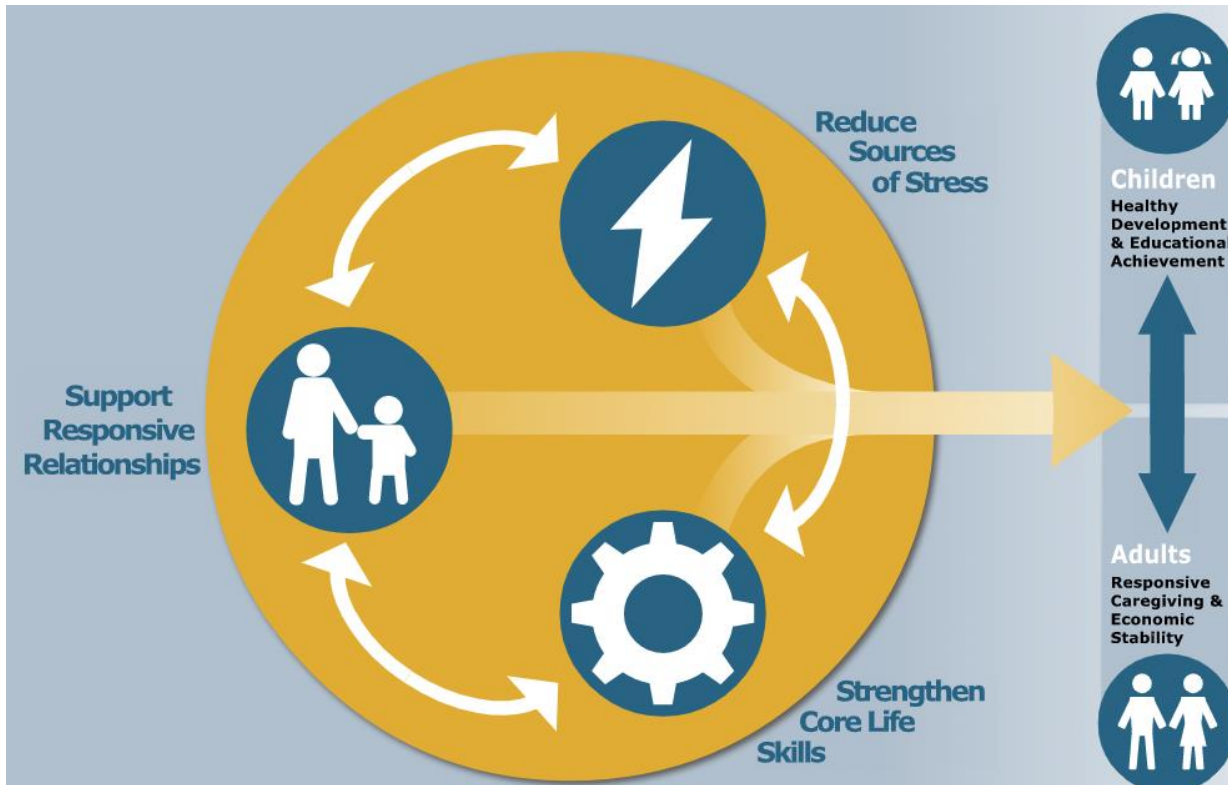






Literacy Connections

HARVARD CENTER
ON THE
DEVELOPING
CHILD



- Responsive Relationships
- Strong core life skills
- Reduce sources of stress

What grows brains best?

Success in the 21st Century

- Motivation
- Sociability; ability to work with others
- Attention
- Self-regulation
- Self Esteem
- Ability to defer gratification
- *Content is not enough—employers say they can teach content—employers want the above skills*

James Heckman

Nobel Laureate in Economics,
“Building a Productive Workforce and Strong
Economy from Birth”

Research Confirms Benefits of Play-based Curriculum

- Curriculum helped children develop executive function skills (EF); e.g., self control, memory and cognitive flexibility
- EF skills highly correlated with positive outcomes in math and reading
- With playful learning *throughout the day*, standardized tests scores increase -- even for high risk children

Tools of the Mind

- Make time for pretend play in classroom and at home
- Play with child. If appropriate, take on role:
Modeling
- 30-45 min. inside and 30-45 min. outside daily
- Provide simple props: e.g., empty boxes, barrels, crates, cloth, tape
- Read/write stories and act them out
- Provide playful, hands-on, experiential learning activities
- OUTDOOR PLAY

Building Brains Playfully by...

- Questions and Answers
- Comments
- Resources



Brain Growth, Pretend Play and the
Outdoors